

Work Order ID 145787

Friday, May 06, 2016 10:51:12 AM

145787

Page 1

Item ID: D5155-7

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Co-Pilot Collective Head (205)

Start Date: 4/28/2016 Start Qty: 5.00

5

Cust Item ID:

Required Date: 5/5/2016 Req'd Qty: 5.00

5

Customer:

Reference:

Approvals:

Process Plan: MUSDate: MAY 09 2016 Tooling:

Date:

QC:

Date: SPC (Y/N):

Date:

Run Start ***NR1***Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D5155	B

100

Cut blanks as per folio

0.00

100

Bandsaw

Memo

0.00

Jeaspa Bandsaw

CUT BLANK AT 5.000"

DAS

14

9-09

16/05/19

110

0.00

110

HAAS SAXIS

Memo

0.00

HAAS CNC vertical machine #5

MACHINE AS PER DWG & FOLIO FB349/ D5155-7

FOLIO REV: 44DWG REV: B

DO NOT BUFF OR POLISH PART

DEBURR

DAS

14

9-09

16/05/25

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐							
		OTHER : ☐							

Work Order ID 145787

Friday, May 06, 2016 10:51:12 AM

145787

Page 2

Item ID: D5155-7 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: Stop ***NS2***
Item Name: Co-Pilot Collective Head (205)
Start Date: 4/28/2016 Start Qty: 5.00 ***5*** Cust Item ID:
Required Date: 5/5/2016 Req'd Qty: 5.00 ***5*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120 *120* QC Quality Control	QC2- Inspect parts off machine FAI/FAIB Memo	0.00 0.00				5	0		DAS 14 9-89 16/05/25
130 *130* QC Quality Control	QC8- Inspect parts - second check Memo	0.00 0.00	B.	16/05/31		5	0		DAS 08 9-89
140 *140* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo	0.00 0.00				5			DAS 38 9-89 MAY 31 2016

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QS1042) Approval 		
Description Work Order Deviation				Disposition					
							Completed By		
							Lead hand / Supervisor Approval Verification		
							QC / QA Coordinator Approval		

Root Cause				FAULT CATEGORY						
Environment ☐	☐	No Re-verification	☐	Pressure/Forced	☐	Temperature/Cure	☐	Power Loss/Surge	☐	Positioned Wrong
Design ☐	☐	Operator	☐	Bending	☐	Set-up	☐	Folio/Program	☐	Outside Dimensions
Doc/Data ☐	☐	Offset/Setup	☐	Centre Not Concentric	☐	BOM/Route	☐	Grain	☐	Over/Under tolerance
Equip/Tooling ☐	☐	Supplier	☐	Cracks	☐	Broken/Damage/Defect	☐	Weld	☐	Part Incorrect
Handling/Pre ☐	☐	Training	☐	Crimp/Kink/Ripple/Wave	☐	Inspection Incomplete/Unqualified	☐	Wrong Stock Pulled	☐	Part Lost/Missing
Material ☐	☐	Use for Testing	☐	Cuffs	☐	Contamination	☐	Out of Sequence	☐	Part Moved
Internal Transport ☐	☐	Poor Information	☐	Crushing	☐	Countersink	☐	Off-set	☐	Drawing
Tribal Knowledge ☐	☐	Rushing	☐	Heat Treat	☐	Cut Too Short	☐	Mislabeled	☐	Finish
LOA ☐	☐	Product Improvement	☐	Wave/Twist in Tube	☐	Instructions Incomplete/Unclear	☐	Fit/Function	☐	Misread
Substation ☐	☐	Process Improvement	☐	Marks/Chatter	☐	Drill Holes	☐	Misaligned/off center	☐	Turning Sequence
Past Expiry Date ☐	☐	Manufacturing Process	☐	OTHER : _____						
Misidentified ☐	☐	Past Due	☐							

Work Order ID 145787

Friday, May 06, 2016 10:51:12 AM

145787

Page 3

Item ID: D5155-7

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Co-Pilot Collective Head (205)

Start Date: 4/28/2016 Start Qty: 5.00

5

Cust Item ID:

Required Date: 5/5/2016 Req'd Qty: 5.00

5

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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160

Identify as per dwg & Stock Location: W4008 0.00***160***

Packaging

Memo

0.00

Packaging

5 MCS 16-06-01

170

QC21- Final Inspection - Work Order Release 0.00

170

QC

Memo

0.00

Quality Control

MCS JUN 01 2016MCS JUN 01 2016

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					
Root Cause Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐		FAULT CATEGORY Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐							
		OTHER : ☐							

Picklist Print

Friday, May 06, 2016 10:51:12 AM

Page 1

Work Order ID: 145787

145787

Parent Item: D5155-7

D5155-7

Parent Item Name: Co-Pilot Collective Head (205)

Start Date: 4/28/2016

Required Date: 5/5/2016

Start Qty: 5.00

Required Qty: 5.00

Comments: IPP REV.A NEW ISSUE JFS 15/01/14 VERIFIED BY: JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
M6061T6B2.750X03.75 0		Purchased		No		100	f	12.0000	0.417	2.194737			

M6061T6B2 750X03 750

6061-T6 BAR 2.75 X 3.75

Location

Loc Qty

Loc Code

MAT005

12

m134158

12

2.2

DAS

14

9-89

16/05/19

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QS1042) Approval 		
Description Work Order Deviation				Disposition					
							Completed By		
							Lead hand / Supervisor Approval Verification		
							QC / QA Coordinator Approval		

Root Cause				FAULT CATEGORY			
Environment ☐	☐ No Re-verification	☐ Pressure/Forced	☐ Temperature/Cure	☐ Power Loss/Surge	☐ Positioned Wrong		
Design ☐	☐ Operator	☐ Bending	☐ Set-up	☐ Folio/Program	☐ Outside Dimensions		
Doc/Data ☐	☐ Offset/Setup	☐ Centre Not Concentric	☐ BOM/Route	☐ Grain	☐ Over/Under tolerance		
Equip/Tooling ☐	☐ Supplier	☐ Cracks	☐ Broken/Damage/Defect	☐ Weld	☐ Part Incorrect		
Handling/Pre ☐	☐ Training	☐ Crimp/Kink/Ripple/Wave	☐ Inspection Incomplete/Unqualified	☐ Wrong Stock Pulled	☐ Part Lost/Missing		
Material ☐	☐ Use for Testing	☐ Cuffs	☐ Contamination	☐ Out of Sequence	☐ Part Moved		
Internal Transport ☐	☐ Poor Information	☐ Crushing	☐ Countersink	☐ Off-set	☐ Drawing		
Tribal Knowledge ☐	☐ Rushing	☐ Heat Treat	☐ Cut Too Short	☐ Mislabeled	☐ Finish		
LOA ☐	☐ Product Improvement	☐ Wave/Twist in Tube	☐ Instructions Incomplete/Unclear	☐ Fit/Function	☐ Misread		
Substation ☐	☐ Process Improvement	☐ Marks/Chatter	☐ Drill Holes	☐ Misaligned/off center	☐ Turning Sequence		
Past Expiry Date ☐	☐ Manufacturing Process	OTHER : _____					
Misidentified ☐	☐ Past Due						

DART AEROSPACE LTD		Work Order: 145787
Description: CO-PILOT COLLECTIVE HEAD		Part Number: DS155-7
Inspection Dwg: DS155 Rev: B		Page 1 of 1

INSPECTION SHEET

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
4.700	$\pm .010$	4.700	—		Vern HI-06	
2.800	$\pm .008$	2.800	—		"	
.35	$\pm .030$	.347	—		"	
.06	$\pm .030$	.060	—		"	
.33	$\pm .030$	.325	—		"	
.227	$\pm .010$	.226	—		"	
1.870	$\pm .010$	1.867	—		"	
R.25	$\pm .030$	R.250	—		R-G	
$\phi .125 \times .350$	$\pm .005 \times \pm .010$	$\phi .126 \times .353$	✓		Vern HI-06	
14°	$\pm 1/2^\circ$	14°	—		C-Square	
.35	$\pm .030$	.348	—		Vern HI-06	
2.047	$\pm .010$	2.047	—		"	
R.19	$\pm .030$	R.190	—		R-G	
2.16	$\pm .030$	2.160	—		Vern HI-06	
.38	$\pm .030$	.374	—		"	
.83	$\pm .030$	.828	—		"	
$\phi .160$	$\pm .005$	$\phi .160$	—		"	
$\phi .860 \times .150$	$\pm .010 \times \pm .010$	$\phi .860 \times .151$	—		"	
$\phi .500$	$\pm .005$	$\phi .500$	—		"	
.254	$\pm .005$	.254	—		"	
.20	$\pm .030$	.200	—		"	
.50	$\pm .030$	.502	—		"	
2.500	$\pm .010$	2.500	—		"	
$\phi .150$	$\pm .005$	$\phi .151$	—		"	
R.25	$\pm .030$	R.250	—		R-G	
R.25	$\pm .030$	R.250	—		"	
.300	$\pm .010$	.300	—		Vern HI-06	
1.900	$\pm .010$	1.900	—		"	
1.100	$\pm .010$	1.100	—		"	
1.500	$\pm .010$	1.500	—		"	
2.70	$\pm .030$	2.700	—		"	
2.500	$\pm .010$	2.500	—		"	

Measured by: 14	Checked by: B. 08	QC Inspector:
Date: 16/05/25	Date: 16/05/31	Date:

Engineering Approval: (If necessary)	Date:
--	--------------

Rev	Date	Change	Revised by	Approved
B	14.07.31	New Issue	KJ	

DART AEROSPACE LTD		Work Order: 145787
Description: CD-PILOT COLLECTIVE HEAD		Part Number: DS755-7
Inspection Dwg: DS755 Rev: B		Page 1 of 1

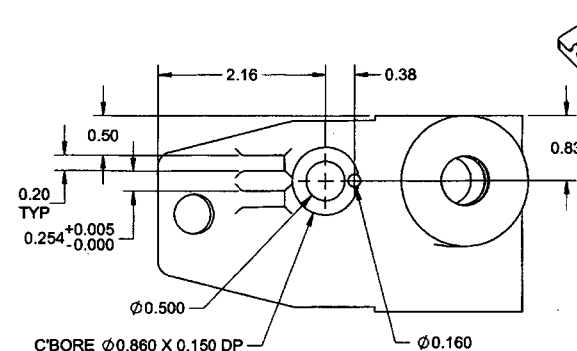
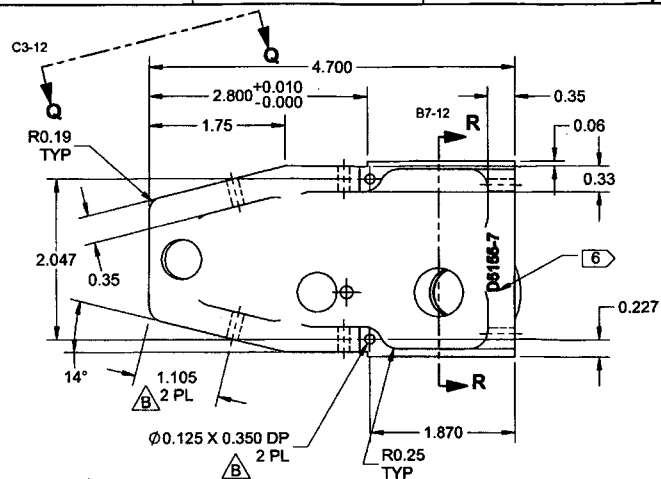
INSPECTION SHEET

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Ø.150	±.005	Ø.151	—		Vern M1-06	
1.100	±.010	1.100	—		"	
1.000	±.030	1.000	—		"	
R.25	±.030	R.250	—		R-6	
10°	±1/2°	10°	—		C-square	
.25	±.030	.248	—		Vern M1-06	
Ø.502	±.005	Ø.503	—		"	
Ø1.600	±.010	1.600	—		"	
0.830	±.010	.830	—		"	
3.70	±.030	3.700	—		"	
.46	±.030	.457	—		"	
1.25	±.030	1.250	—		"	
Ø.150	±.005	Ø.151	—		"	
R.250	±.030	R.250	—		R-6	
1.100	±.030	1.100	—		Vern M1-06	
.239	±.010	.241	—		"	
.039	±.003	.039	—		"	
.020	±.010	.023	—		"	
Ø.625	±.005	Ø.626	—		"	
Ø.665	±.002	Ø.664	—		"	
.55	±.030	.548	—		"	
.35	±.030	.350	—		"	
1.06	±.030	1.050	—		"	
.57	±.030	.575	—		"	
.13	±.030	.126	—		"	
R.06	±.030	R.060	—		R-6	
R.09	±.030	R.060	—		"	
Ø.0605	±.0005	Ø.060	—		Vern M1-06	
47°	±1/2°	47°	—		C-square	
.100	±.030	.101	—		Vern M1-06	
R.030	±.030	R.030	—		R-6	

Measured by: 14	Checked by: B.2	DAS 03	QC Inspector:
Date: 16/05/25	Date: 16/05/31	9-00	Date:

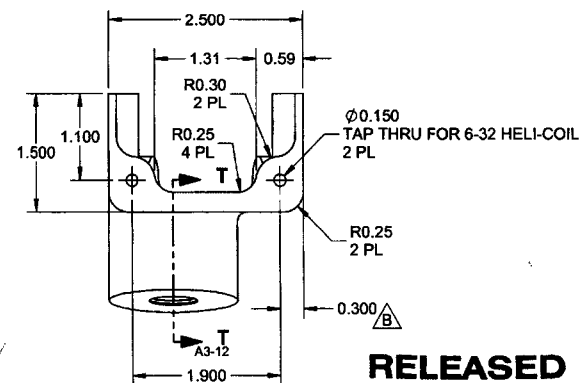
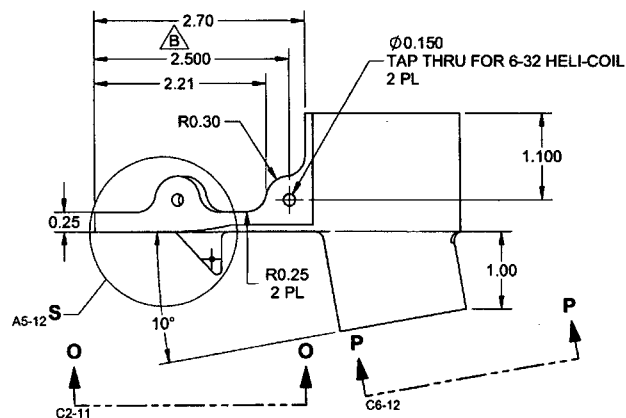
Engineering Approval: (If necessary)	Date:
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Rev	Date	Change	Revised by	Approved
B	14.07.31	New Issue	KJ	



VIEW O-O

B7-11



RELEASED

A.R. 2015 JUL 02

NOTES:

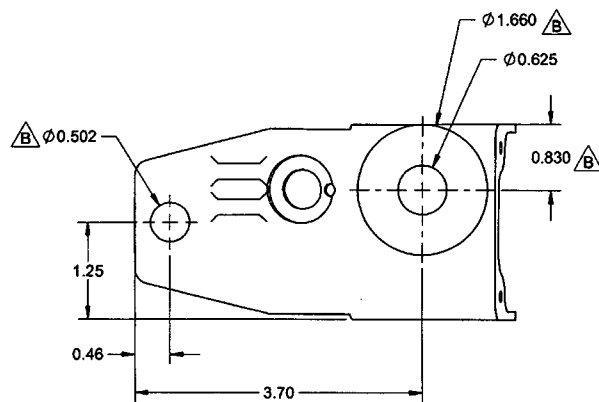
- 1) MATERIAL: 6061-T6/T651/T6511/T62 ALUMINUM BAR
PER QQ-A-225/8 OR AMS-QQ-A-225/8 (OR AMS 4117/4128/4115/4116)
OR QQ-A-200/8 OR AMS-QQ-A-200/8 (OR AMS 4160)
OR ASTM B211 OR ASTM B221
REF DART SPEC M6061T6B
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: IDENTIFY PER QSI 044 6.3 IN THIS AREA TO MAX DEPTH
OF 0.010 WITH A MIN. TOOL RAD OF R0.010
- 7) WEIGHT: 0.56 lbs
- 8) UNDIMENSIONED FEATURES DEFINED BY D5155-7.SLDPRT

D5155-7 CO-PILOT COLLECTIVE HEAD (205)

UNCLASSIFIED COPY
FOR INFORMATION ONLY
NO. 145787 ML5
160509

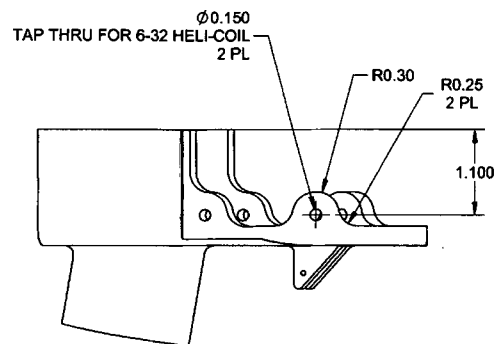
APPROVED

DESIGN	VS	DART AEROSPACE LTD	
DRAWN	VS	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. B
MFG. APPR.	JFS	D5155	SHEET 11 OF 14
APPROVED	HS	TITLE	SCALE
DE APPR.	DS	CO-PILOT COLLECTIVE HEAD	NTS
DATE	15.05.21	COPYRIGHT © 2013 BY DART AEROSPACE LTD	
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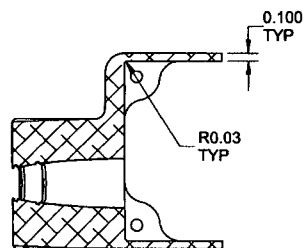
VIEW P-P

B5-11



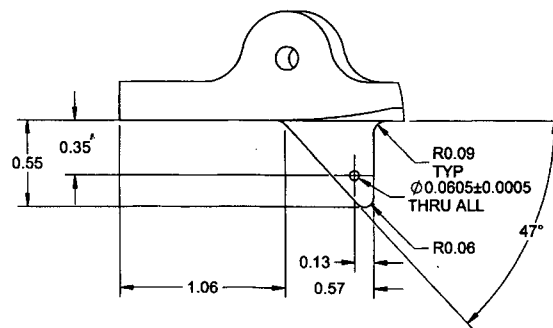
VIEW Q-Q

D7-11



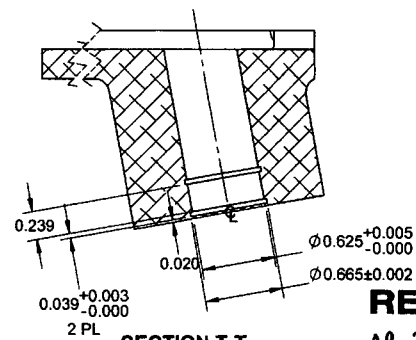
SECTION R-R

C6-11



DETAIL S

B6-11



SECTION T-T

B2-11

RELEASED
A.R. 2015 JUL 02

NOTES:

- 1) MATERIAL: N/A
- 2) FINISH: N/A
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: N/A
- 7) WEIGHT: N/A

D5155-7 CO-PILOT COLLECTIVE HEAD (205)

DETAIL VIEWS

APPROVED

DESIGN	VS
DRAWN	VS
CHECKED	RF
MFG. APPR.	JFS
APPROVED	HS
DE APPR.	DS
DATE	15.05.21

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. **D5155** REV. B
SHEET 12 OF 14
TITLE **CO-PILOT COLLECTIVE HEAD** SCALE NTS

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